REMARKS

This Amendment After Final Rejection is submitted in response to the outstanding final Office Action, dated August 5, 2009. The present application was filed on February 22, 2002 with claims 1 through 26. Claims 1, 3, and 18-26 were cancelled in the

5   Amendment and Response to Office Action dated April 13, 2007. Claims 2 and 4-17 are presently pending in the above-identified patent application. In this response, Applicants propose to amend claim 4. No additional fee is due.

This amendment is submitted pursuant to 37 CFR §1.116 and should be entered. In particular, the amendment ties the independent method claim to another statutory category and

10   thereby addresses the section 101 rejections. The Amendment places all of the pending claims, i.e., claims 2 and 4-17, in a form that is believed allowable, and, in any event, in a better form for appeal. It is believed that examination of the pending claims as amended, which are consistent with the previous record herein, will not place any substantial burden on the Examiner.

In the Office Action, the Examiner rejected claims 2 and 4-17 under 35 U.S.C.

15   §101 because the claimed invention is directed to non-statutory subject matter, and rejected claim 2 and 4-17 under 35 U.S.C. §103(a) as being unpatentable over Parida et al. (IDS document: Pattern Discovery on Character Sets and Real-valued Data: Linear Bound on Irredundant Motifs and an Efficient Polynomial Time Algorithm, presentation on The Eleventh ACM-SIAM Symposium on Discrete Algorithms (SODA), held on January 9-11, 2000. See

20   "SODA 2000 program," printed from the internet at http://www.siam.org/meetings/da00/ on 7/7/08).

Section 101 Rejection

Claims 2 and 4-17 were rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. Regarding claim 4, the Examiner asserts

25   that, while the claim(s) require the method be performed by a processor, the processor does not have to be a particular apparatus or machine and that there is no physical transformation because a process of sequence motif manipulation does not transform an article or physical subject to a different state or thing.

Applicants note that independent claim 4 has been amended to require *providing a*

30   *system, wherein said system comprises a memory, at least one hardware processor coupled to*

said memory, and a software module loadable into said memory and executable on said at least one hardware processor; and to require *wherein said method is performed by said software module executing on said at least one hardware processor.* Thus, the amendment ties the independent method claim to another statutory category.

5   Applicants submit that each of the claims, as amended, are in full compliance with 35 U.S.C. §101. Accordingly, Applicants respectfully request that the rejection under 35 U.S.C. §101 be withdrawn.

Independent Claims 4, 16 and 17

Independent claims 4, 16 and 17 are rejected under 35 U.S.C. §103(a) as being
10   unpatentable over Parida et al. In particular, the Examiner asserts that the algorithm disclosed in Parida is based on first detecting motifs or substrings of motifs, and then two agreeing motifs are concatenated to obtain a larger motif. At the end of each iteration, the set of budding motifs are trimmed so that they do not grow exponentially. The Examiner asserts that this trimming step is interpreted as being the same as the removing step of the instant claims. (Page 298 and the
15   mathematical basis presented on pages 299-301.) The Examiner further asserts that the algorithm to detect and concatenate motifs is presented on pages 303-304. The Examiner also asserts that a subtitle of Parida, "Algorithm to Detect Irredundant Motifs", indicates that pages 303-304 of Parida is an algorithm and is for detection. Finally, the Examiner asserts that one of ordinary skill in the art would have been motivated by Parida's proofs to write an algorithm for
20   realizing the concatenation as proved by Parida.

Applicants note that the mathematical basis on pages 299-301 is an existential proof and is *not* a detection algorithm. The proof can be described as follows: For an input s, the footprints of all the overlapping maximal motifs (possibly exponential in number) are marked on s. The footprints of the redundant motifs are systematically trimmed, to expose only the
25   irredundant and an armortization argument shows only a polynomial number of irredundant motifs. In the proof, there is *no* concern with how the motifs were discovered to begin with; the goal is merely bounding the number of irredundant motifs, for any input. Moreover, the cited paper does *not* disclose or suggest the <u>concatenation steps</u> *recited in the independent claims.* In particular, Parida does *not* disclose or suggest concatenating each of the plurality of first motifs
30   with another of the plurality of first motifs to create a plurality of concatenated motifs; and

concatenating motifs that have the same location list to create at least one new motif.

Regarding the Examiner's assertion that a subtitle of Parida, "Algorithm to Detect Irredundant Motifs", indicates that pages 303-304 of Parida is an algorithm and is for detection, Applicants note that "constructive" proofs are considered mathematical algorithms; the "existential" proofs, such as those disclosed in Parida, are *not* necessarily efficient or even implementable algorithms. Hence, a paper can have "algorithm" in the title and *not* be implementable by a person of ordinary skill in the art.

Regarding the Examiner's assertion that one of ordinary skill in the art would have been motivated by Parida's proofs to write an algorithm for realizing the concatenation as proved by Parida, Applicants note that more insightful observations and theorems are typically required to make "existential" proofs implementable. In the present case, the SIP algorithm disclosed in the present application enables a person of ordinary skill in the art to implement the claimed pattern discovery method.

Independent claims 4, 16, and 17 require concatenating each of the plurality of first motifs with another of the plurality of first motifs to create a plurality of concatenated motifs; removing one or more selected motifs, wherein said one or more selected motifs are any of the concatenated motifs and the first motifs, wherein the step of removing comprises removing suffix motifs, and wherein each motif in the concatenated motifs and the first motifs has an associated location list, and wherein the step of removing suffix motifs comprises the steps of: offsetting each location list for each of the motifs in the concatenated motifs and the first motifs to zero; checking each location list for each of the motifs in the concatenated motifs and the first motifs to determine location lists that are the same; and concatenating motifs that have the same location list to create at least one new motif.

Thus, Parida does not disclose or suggest concatenating each of the plurality of first motifs with another of the plurality of first motifs to create a plurality of concatenated motifs; removing one or more selected motifs, wherein said one or more selected motifs are any of the concatenated motifs and the first motifs, wherein the step of removing comprises removing suffix motifs, and wherein each motif in the concatenated motifs and the first motifs has an associated location list, and wherein the step of removing suffix motifs comprises the steps of: offsetting each location list for each of the motifs in the concatenated motifs and the

9

first motifs to zero; checking each location list for each of the motifs in the concatenated motifs and the first motifs to determine location lists that are the same; and concatenating motifs that have the same location list to create at least one new motif, as required by independent claims 4, 16, and 17.

5

Dependent Claims 2 and 5-15

Claims 2 and 5-15 are dependent on claim 4 and are therefore patentably distinguished over Parida et al. because of their dependency from amended independent claim 4 for the reasons set forth above, as well as other elements these claims add in combination to their base claim.

10

All of the pending claims following entry of the amendments, i.e., claims 2 and 4-17, are in condition for allowance and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the telephone number indicated below.

15

The Examiner's attention to this matter is appreciated.

Respectfully submitted,

/Kevin M. Mason/

Date: November 5, 2009

20

Kevin M. Mason
Attorney for Applicants
Reg. No. 36,597
Ryan, Mason & Lewis, LLP
1300 Post Road, Suite 205
Fairfield, CT 06824

25

(203) 255-6560